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Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onward) (Sem.-5)
DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : MCA-502

M.Code : 74382

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students have to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. Build a binary search tree using following nodes :
50, 60, 70, 80, 90, 10, 20, 30, 40.
2. a) What are various applications of Red Black Trees? Explain.
b) Write the procedure for building a min heap by taking suitable example.

SECTION-B

3. a) Differentiate between Polynomial and Exponential complexities.
b) Discuss the complexity of deletion of a node from binary tree.
4. Compare the performance of selection sort and heap sort using following list :
5, 15, 45, 35, 65, 55, 95, 45.

SECTION-C

5. Discuss the dynamic programming approach for Fractional Knapsack problem in detail.
6. a) Explain divide and conquer solution to any computation problem.
b) Sort the following list of integers using Merge-Sort :
50, 5, 40, 3, 2, 70, 55, 90, 30.

SECTION-D

7. Illustrate Breadth First Search by taking suitable example.
8. Write and explain Dijkstra algorithm in detail.

SECTION-E

9. Write briefly :

- a) Describe briefly two applications of graph data structure.
- b) What are AVL Trees?
- c) What is the complexity of building a Heap?
- d) What is meant by polynomial running time?
- e) How Backtracking approach differs from Divide and Conquer?
- f) Write a short note on working of Bubble sort.
- g) Differentiate between Linear search and Binary search.
- h) Name two applications of depth first search.
- i) Compare the complexities of Quick-Sort and Heap-Sort sort.
- j) What is the application of Queue data structure?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.